PIMag® Precision Linear Stage

Versatile Options for Adapting to Requirements

V-508

- Travel ranges 80, 170, and 250 mm
- Ironless or iron core linear motor
- Incremental or absolute linear encoder, various resolutions
- Compact cross section: 80 mm × 25 mm
- Crossed roller guides for high load capacity

Flexible adaption

The construction allows flexible adaption to the requirements. Technically sophisticated and cost-critical applications can be equally served with different travel ranges, drives, and measuring systems. XY assemblies are also possible

PIMag® magnetic direct drive

3-phase magnetic direct drives do not use mechanical components in the drivetrain, they transmit the drive force to the motion platform directly and without friction. The drives reach high velocities and accelerations.
Ironless motors are particularly suitable for positioning tasks with the highest demands on precision because there is no undesirable interaction with the permanent magnets. This allows smooth running even at the lowest velocities and at the same time, there is no vibration at high velocities. Nonlinearity in control behavior is avoided and any position can be controlled easily. The drive force can be set freely.
Iron core motors are used when forces and accelerations need to be achieved in a limited installation space. The design with iron cores maximizes the magnetic forces and ensures high thermal stability of the drive.

Crossed roller guide

With crossed roller guides, the point contact of the balls in ball guides is replaced by line contact of the hardened rollers. Consequently, they are considerably stiffer and need less preload, which reduces friction and allows smoother running. Crossed roller guides are also distinguished by high guiding accuracy and load capacity. Force-guided rolling element cages prevent cage creep.

Direct position measurement

Position measuring takes place directly at the motion platform with the highest accuracy so that nonlinearity, mechanical play or elastic deformation have no influence on position measuring.

Application fields

Industry and research. Measuring technology, photonics and precision scanning in semiconductor or medicine technology

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Specifications

Motion and positioning	V-508.2	V-508.6	V-508.9	Unit	Tolerance
Active axes	X	X	X		
Travel range	80	170	250	mm	
Pitch / yaw	±100	±200	±300	µrad	max.
Straightness / flatness	±4	±10	±20	µm	max.
Velocity	V-508.2x1: 0.6 (1) V-508.2x2: 0.7 (1)	V-508.6x1: 0.6 (1) V-508.6x2: 0.7 (1)	V-508.9x1: 0.6 (1) V-508.9x2: 0.7 (1)	m/s	max.
Acceleration	5	5	5	m/s²	max.

Mechanical properties	V-508.2	V-508.6	V-508.9	Unit	Tolerance
Load capacity in Z	100	100	100	N	max.
Moved mass	V-508.2x1: 0.45 V-508.2x2: 0.35	V-508.6x1: 0.75 V-508.6x2: 0.6	V-508.9x1: 1.01 V-508.9x2: 0.79	kg	
Overall mass	V-508.2x1: 1.1 V-508.2x2: 1.0	V-508.6x1: 1.7 V-508.6x2: 1.6	V-508.9x1: 2.3 V-508.9x2: 2.1	kg	
Guide type	Crossed roller guide with anti-creep system	Crossed roller guide with anti-creep system	Crossed roller guide with anti-creep system		

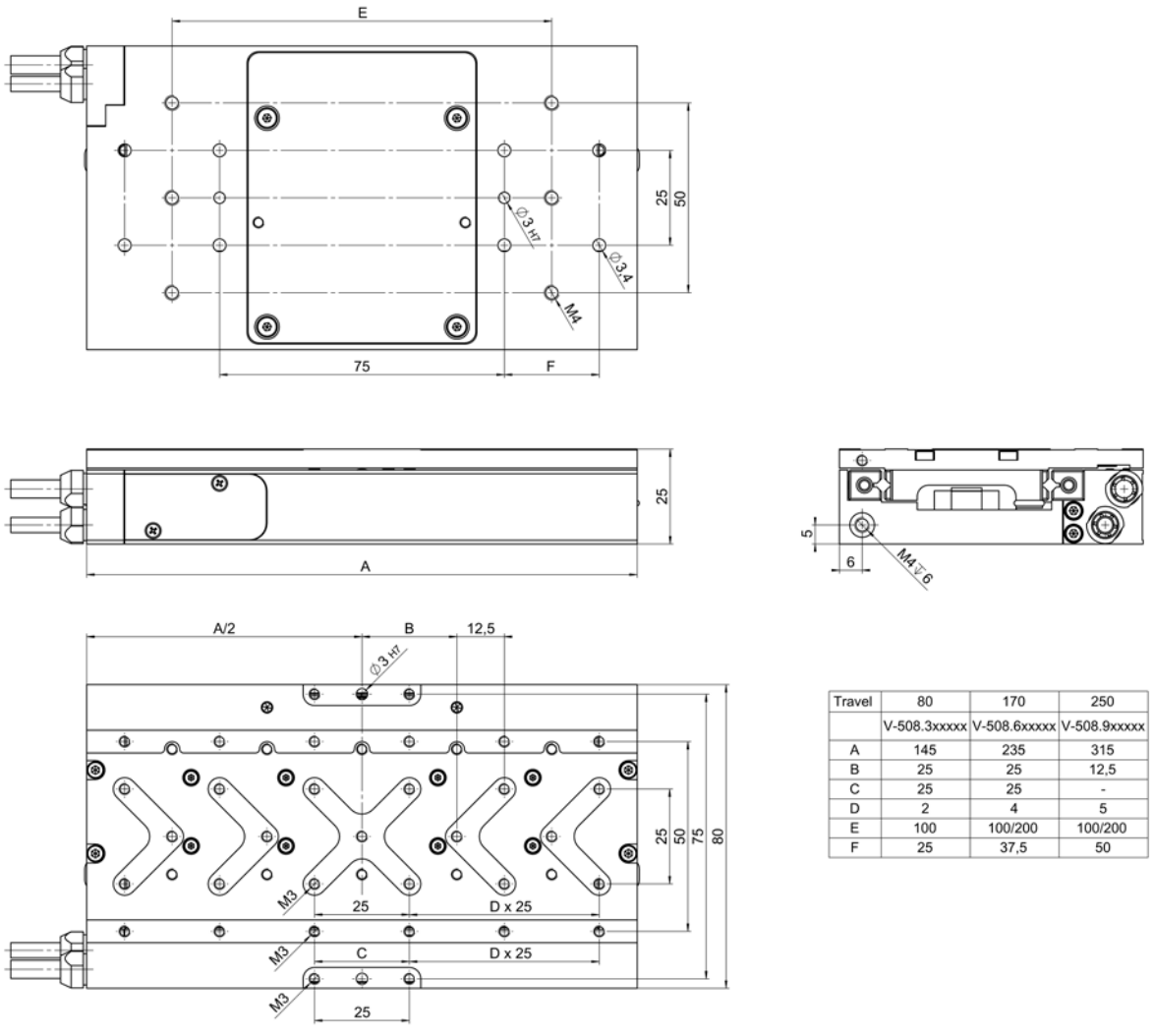
Encoder options	V-508.x3	V-508.x5	V-508.xB	Unit	Tolerance
Integrated sensor	Incremental linear encoder	PIOne incremental linear encoder	Absolute encoder		
Sensor signal	Sin/cos, 1 V peak-peak, 80 µm signal period	Sin/cos, 1 V peak-peak, 2 µm signal period	BiSS-C		
Sensor resolution	10 (2)	0.2 (2)	78	nm	typ.
Minimum incremental motion	20	1	160	nm	typ.
Bidirectional repeatability	±0.1	±0.05	±0.15	µm	typ.

Drive properties	V-508.xx1	V-508.xx2	Unit	Tolerance
Drive type	Linear motor, ironless, 3-phase	Linear motor, iron core, 3-phase		
Intermediate circuit voltage, RMS	48	48	V DC	
Peak force	12	14	N	typ.
Nominal force	3	5	N	typ.
Peak current, RMS	3.2	3.2	A	typ.
Nominal current, RMS	0.7	1.1	A	typ.
Force constant, RMS	4.28	4.81	N/A	typ.
Resistance phase-phase	5.92	2.46	Ω	typ.
Inductance phase-phase	1.26	1.94	mH	typ.
Back EMF phase-phase	5.36	3.02	V·s/m	max.
Pole pitch N-N	20	18	mm	
Permitted temperature for positioner components	80	80	°C	max.

Miscellaneous	V-508
Operating temperature range	10 °C to 50 °C
Humidity	20 – 90% rel., not condensing
Material	Aluminum, blue / black anodized
Motor connector	HD D-sub 26 (m)
Sensor connector	D-sub 15 (f)
Cable length	2 m

(1) V-508.x5: max. 0.2 m/s when combined with the C-891
(2) interpolated
The specifications apply to room temperature (22 °C ±3 °C), specifications may deviate outside of this range.

Drawings / Images



Travel	80	170	250
	V-508.3xxxxx	V-508.6xxxxx	V-508.9xxxxx
A	145	235	315
B	25	25	12,5
C	25	25	-
D	2	4	5
E	100	100/200	100/200
F	25	37,5	50

V-508, dimensions in mm

Ordering Information

80 mm

V-508.231020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 80 mm travel range, 100 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, ironless 3-phase linear motor, 48 V

V-508.232020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 80 mm travel range, 100 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-508.251020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 80 mm travel range, 100 N load capacity, PIOne linear encoder with sin/cos signal transmission, 2 µm sensor signal period, ironless 3-phase linear motor, 48 V

V-508.252020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 80 mm travel range, 100 N load capacity, PIOne linear encoder with sin/cos signal transmission, 2 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-508.2B1020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 80 mm travel range, 100 N load capacity, absolute encoder, 78 nm sensor resolution, ironless 3-phase linear motor, 48 V

V-508.2B2020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 80 mm travel range, 100 N load capacity, absolute encoder, 78 nm sensor resolution, iron core 3-phase linear motor, 48 V

170 mm

V-508.631020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 170 mm travel range, 100 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, ironless 3-phase linear motor, 48 V

V-508.632020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 170 mm travel range, 100 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-508.651020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 170 mm travel range, 100 N load capacity, PIOne linear encoder with sin/cos signal transmission, 2 µm sensor signal period, ironless 3-phase linear motor, 48 V

V-508.652020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 170 mm travel range, 100 N load capacity, PIOne linear encoder with sin/cos signal transmission, 2 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-508.6B1020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 170 mm travel range, 100 N load capacity, absolute encoder, 78 nm sensor resolution, ironless 3-phase linear motor, 48 V

V-508.6B2020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 170 mm travel range, 100 N load capacity, absolute encoder, 78 nm sensor resolution, iron core 3-phase linear motor, 48 V

250 mm

V-508.931020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 250 mm travel range, 100 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, ironless 3-phase linear motor, 48 V

V-508.932020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 250 mm travel range, 100 N load capacity, incremental linear encoder with sin/cos signal transmission, 80 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-508.951020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 250 mm travel range, 100 N load capacity, PIOne linear encoder with sin/cos signal transmission, 2 µm sensor signal period, ironless 3-phase linear motor, 48 V

V-508.952020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 250 mm travel range, 100 N load capacity, PIOne linear encoder with sin/cos signal transmission, 2 µm sensor signal period, iron core 3-phase linear motor, 48 V

V-508.9B1020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 250 mm travel range, 100 N load capacity, absolute encoder, 78 nm sensor resolution, ironless 3-phase linear motor, 48 V

V-508.9B2020
PIMag® precision linear stage, 80 mm × 25 mm cross section, 250 mm travel range, 100 N load capacity, absolute encoder, 78 nm sensor resolution, iron core 3-phase linear motor, 48 V